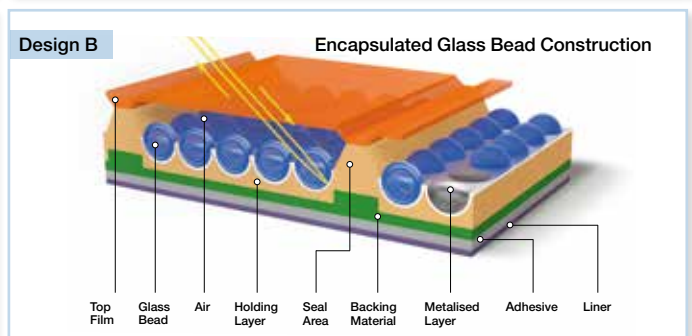
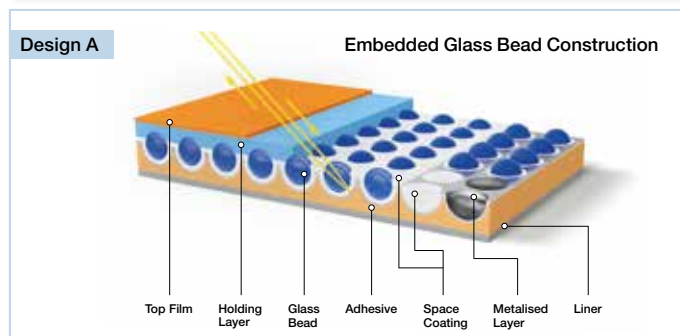
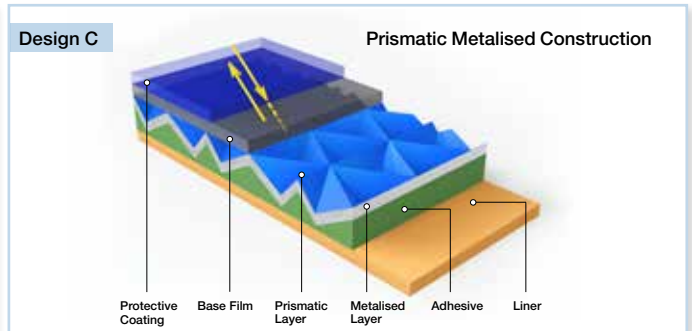
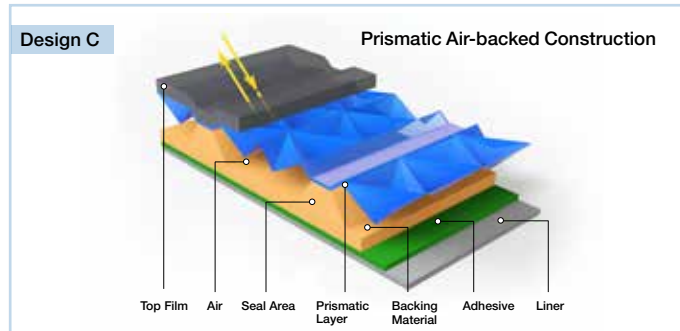


# Overview of Retroreflective Materials

## Guidelines for the use of different materials in different traffic sign types

### Technical illustrations of the basic composition of different retroreflective sheeting



### Photometric Performance Classes for Traffic Signs

#### RA1, Design A & C

Retroreflective materials of the standard performance grade used for traffic signs, are available in designs A and C. Glass bead based materials have been successfully used for traffic signs for many years, and they are used in particular for traffic signs in slow moving traffic zones, e.g. no-parking signs or short-term parking signs. They are also used for tourist information signs, street signs and advertising signs. Design A materials are not rotation sensitive.

RA1, Design A

**ORALITE® 5510**  
Engineer Grade

**ORALITE® 5710**  
Engineer Grade Premium

RA1, Design C

**ORALITE® 6710**  
Engineer Prismatic Grade

#### RA2, Design B & C

Class RA2 is achieved with retroreflective sheeting of design B or C. In general, the RA2 grade offers higher retroreflective values for improved long distance visibility at night. RA2 materials are now an established standard for traffic signs. They are mainly used for applications such as stop signs and speed restriction signs. Design B materials have especially good reflective properties at large entrance angles; e.g. at roundabouts.

RA2, Design B

**ORALITE® 5810**  
High Intensity Grade

RA2, Design C

**ORALITE® 5910**  
High Intensity Prismatic Grade

#### RA3, Design C

Reflective sheeting of performance class RA3 are only available as prismatic materials in design C. They provide the highest reflective performance values. These materials are used for traffic signs in areas where a particularly high degree of reflectivity is required. They are mainly used for long distance guidance signs e.g. on motorways and in brightly illuminated environments.

**ORALITE® 6910**  
Brilliant Grade

The requirements for which material class to use for which sign type, differs slightly from country to country. The below guidelines are from Germany, and in our experience these are quite representative for Europe as a whole.

Signs according to section 39 to 43 of the German Road Traffic Act		normal environment			brightly lit environment and/or many external light sources		
		motorway	suburban	urban	motorway	suburban	urban
all signs other than those listed below*)	Installation location: <b>right</b>	RA2	RA1/RA2	RA2	RA2/RA3	RA2	RA3/be
	Installation location: <b>high/left</b>	RA2	RA2	RA2	RA3	RA2/RA3	RA3/be
Waiting and stop signs at railway crossings		-	RA2/RA3	RA2/RA3	-	RA3	RA3
Waiting and stop signs at intersections; junctions and road narrows signs; signs for the specified direction of travel and passing of vehicles		RA2/RA3	RA2	RA2/RA3	RA3	RA3	RA3/be
Construction signing		RA2	RA2	RA2**)	RA2/RA3	RA2	RA2
Special routes, no stopping and parking; tourist information signs		RA1					

Explanations for table 1:

RA1: Retroreflection grade 1 (previously „type 1“)

RA2: Retroreflection grade 2 (previously „type 2“)

RA3: Retroreflection grade 3 (previously „type 3“)

be: Illuminated from inside or outside

/: Selection according to boundary condition

left: If the sign is only located on the left, a higher-value performance class is recommended compared to installation location on the right

The extract from the FGSV [Road and Transportation Research Association] regulations „Information sheet for the choice of photometric performance class of vertical traffic signs and traffic infrastructure, MLV, Edition 2011“, is reproduced in part with the permission of the FGSV. The applicable edition of the FGSV regulations is the most recent edition, which is available from FGSV Verlag, Wesseling Str. 17, 50999 Cologne, www.fgsv-verlag.de.